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# Transforming Collateral Management with Digital Assets

A DTCC DIGITAL LAUNCHPAD COLLABORATION  
WITH JAPAN SECURITIES CLEARING CORPORATION (JSCC)



## STRATEGIC OUTLOOK: FROM OUR GLOBAL HEAD OF DIGITAL ASSETS

Digital asset technology is set to have a transformational effect on financial markets, bringing new efficiencies, business models, and liquidity opportunities to the ecosystem. It gives us the opportunity to reshape the entire value chain, from primary market issuance to post-trade activities like custody and asset servicing. Institutional demand for tokenization of real-world financial assets is growing, and its impact on capital markets could be similar to the impact the Internet had on information exchange. This technology promises to revolutionize how we approach capital markets, unlocking new value and streamlining processes across the industry.

### THE PATH TO PROGRESS

Let's face the facts. The digital asset landscape is evolving, and there's work to be done to fully harmonize standards, controls, and operations. The strength of US markets is that we have one post-trade provider; we're aiming to do the same for digital markets. While we have enough regulatory and legal clarity to move forward, the challenge lies in building a common infrastructure that enables interconnectivity across the ecosystem. This is more than systems communicating; it's about aligning on standards and frameworks that bring traditional and DLT-based systems together. We're rallying the industry towards this goal to drive integration and progress.

### ADVANCING THE ECOSYSTEM

Today's digital asset initiatives often involve only a handful of participants. They're frequently implemented on different networks, with different protocols for connectivity and functions. We need to work together. **Digital asset initiatives need an ecosystem of participants to succeed, from sell and buy-side firms, to custodians, to financial market infrastructure providers to fintechs.** As we create the ecosystem to power digital markets, we need to prioritize new innovations that can co-exist, interoperate, and build upon each other, while embracing the diversity of approaches from past initiatives.

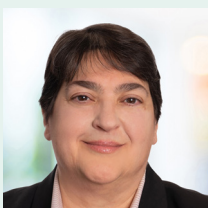
### THE FUTURE OF DIGITAL INNOVATION

DTCC is leading the work to coalesce the industry around solving this challenge. **Our Digital Launchpad is the industry's path to production today, as we build the digital infrastructure of tomorrow.** Why are we doing this? Because, as the post-trade market infrastructure for the world's largest capital market, it's our responsibility to provide the same certainty, scalability, and resilience to digital markets as we do to traditional ones – delivering on our participants' expectations and the future of finance. We draw upon years of experience leading the markets through change – most recently evidenced through our work moving the markets to a T+1 accelerated settlement cycle in the US and beyond.

DTCC Digital Launchpad is more than just a milestone – it is a game-changer in our journey to build an open and interoperable digital asset ecosystem. What sets the Launchpad apart is that we're not just offering another sandbox; we're providing a robust, scalable, end-to-end technology stack designed to help the market collaborate and address some of its biggest pain points. Our goal is to bring together the capital markets ecosystem – including clients, peers, partners and global regulators – to drive real progress and efficiency, moving the industry toward widespread adoption of digital technology.

I encourage you to read on about our work with JSCC to transform collateral management using DLT. It's the first of many experiments on the DTCC Digital Launchpad. I look forward to your collaboration as we build an interoperable digital asset ecosystem that will power digital markets for years to come.

**See you on the Launchpad!**



**NADINE CHAKAR**  
Managing Director,  
Global Head of DTCC Digital Assets

# THE GATEWAY TO PRODUCTION: DTCC DIGITAL LAUNCHPAD

**We're excited to introduce our industry sandbox for experimentation and implementation, the DTCC Digital Launchpad.**

DTCC Digital Launchpad is an open ecosystem where market participants, technology providers, and others can collaborate to achieve scalable digital adoption. The ultimate objective is to build production-ready, secure and efficient digital infrastructure solutions and market standards to transform capital markets for generations to come. Similar to the role DTCC plays in post trade infrastructure today, we aspire to provide the same level of support for digital assets globally as we build towards our future.

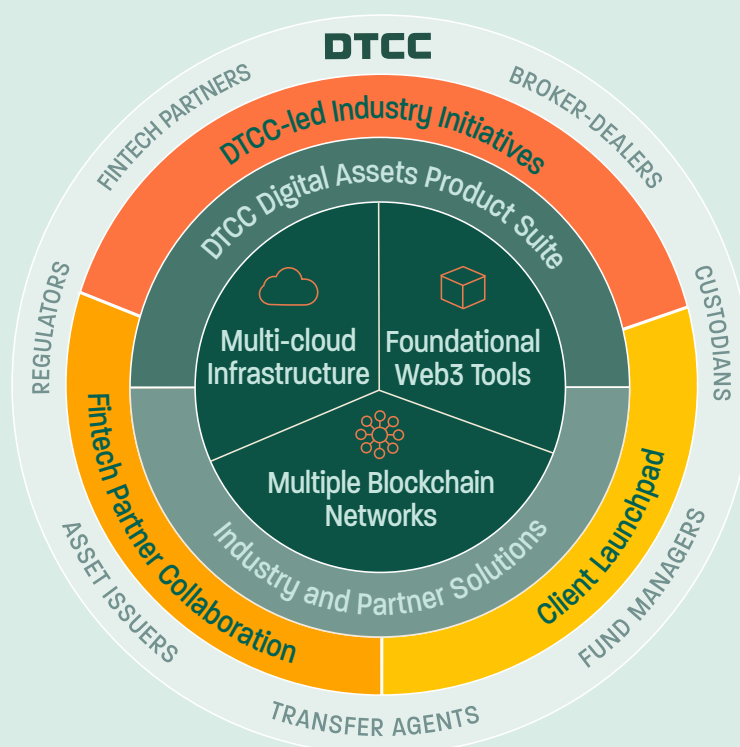
At its core, DTCC Digital Launchpad is a multi-cloud technology platform with flexible connectivity options to a variety of public and private blockchain networks, a core set of foundational tools, and digital assets products to enable rapid development of solutions with an end-to-end life cycle. In addition to DTCC's own production-ready digital assets product suite, the Launchpad will also host products and services from leading fintech partners to allow participants to build and experiment with different kinds of technology platforms.

Digital Launchpad enables both shared and dedicated environments for participants to collaborate on industry solutions or develop their own digital solutions in a private space. The objective is to provide flexibility for clients at different stages of their digital journey.

- 1. Industry Launchpad** – An open ecosystem for broad collaboration. These strategic initiatives are designed to align market participants around solutions which address critical pain points and pave the way for scalable solutions that drive industry-wide transformation.
- 2. Client Launchpad** – A dedicated space to leverage comprehensive digital asset capabilities from DTCC Digital Assets. Clients can explore new business models and develop their own innovative use cases without substantial investment. DTCC's professional services team is on hand to offer guidance and provide product support to drive these initiatives to production.

This open ecosystem is intended to support the acceleration of digital asset capabilities across global financial markets as we collaborate amongst clients, peers and fintech partners to advance digital markets.

## INTEGRATED VIEW OF DTCC DIGITAL LAUNCHPAD ECOSYSTEM



## EXECUTIVE SUMMARY

### Collateral Management on the Digital Launchpad: A Collaboration with JSCC

As leading infrastructure providers for the financial industry, DTCC and Japan Securities Clearing Corporation (JSCC) have been exploring how blockchain and distributed ledger technology (DLT) could have a transformative effect on global capital markets. We've been examining how tokenization of real-world assets could revolutionize collateral management by addressing long-standing inefficiencies in existing business processes while introducing new capabilities.

As part of our collective active pursuit of the transformative potential of digital assets in collateral management, JSCC leveraged DTCC's Digital Launchpad to develop a groundbreaking proof of concept (PoC) focused on Central Counterparties (CCPs). Given their vital role in capital markets, CCPs are a critical part of the collateral management value chain, receiving collateral deposits across a diverse range of products. By leveraging digital assets for collateral processing, CCPs can potentially enhance market stability, improve digital asset quality, and increase the efficiency and liquidity of collateral.

This PoC goes beyond the deposit and return of digital assets, cash, stocks, and bonds as collateral. It offers innovative solutions aimed at overcoming existing constraints and exploring new business opportunities.

#### Key Takeaways

- Notably, the experiment helped demonstrate that digital assets can significantly enhance the speed, transparency, and efficiency of collateral processes, leading to improved risk management, capital utilization and liquidity for participants at all levels in the ecosystem.
- Using DTCC's Digital Launchpad, JSCC could rapidly issue tokens representing cash, stocks, and bonds as native digital assets without needing to develop their own infrastructure, significantly increasing the speed at which the idea could be taken to execution.
- By tokenizing assets, automating margin calculations and the movement of assets as collateral on the network, JSCC realized operational and capital efficiencies for each market participant in the process.
- The PoC demonstrated seamless integration between margin calls and deposits/withdrawals of tokenized assets, and standardized smart contracts/applications leading to mitigation of inefficiencies in workflow and communications across the CCP, clearing members, and clients.
- Additionally, the PoC enabled identification of enhanced mechanisms for intraday swapping or replacing various types of digital assets (cash, stocks, bonds), and the establishment of an on-chain shared database to enable sell-side and buy-side participants to evaluate and optimize their own collateral processes, while significantly improving their ability to manage operational and market risks.

In the following section, we zoom in on the specifics of this groundbreaking experiment, highlighting the practical applications and market impact, and the path forward for JSCC.

See How It Works

## HOW IT WORKS

To explore how to deliver capital and operational efficiencies for their clients, JSCC leveraged DTCC's Digital Launchpad to develop a PoC to examine how the collateral management process could be made more efficient. JSCC built the PoC using a Hyperledger Besu Ethereum network, among the public and private blockchain network options available in DTCC Digital Launchpad.

The PoC focused on modelling how margin calls and their associated processes could be automated, made more efficient and transparent for all participants using digital assets and smart contracts – or rules that automatically execute on a distributed ledger when certain conditions are met.

### In this use case:

See diagram on the next page for all referenced steps.

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JSCC created a network consisting of blockchain nodes for sell-side and buy-side institutions, Clearing Members and their clients respectively, on the Launchpad.

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**Step 1.** A Token Issuer node was created to mint digital assets (cash, equity, and bonds) on the network, which supplied the native tokens and assets that could then be moved around and exchanged on the network.

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**Step 2.** A multi-functional smart contract was created to issue and manage margin calls to JSCC's Clearing Members (sell-side institutions).

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The same smart contract was used by Clearing Members to distribute margin calls to their clients (buy-side) and facilitate the end-to-end movement of collateral in response to the calls.

**Step 3.** In the case of clients maintaining segregated accounts with their Clearing Member (**Client B** in the diagram), the JSCC node could directly calculate the portion of the margin call due from the specific buy-side client.

**Step 3a.** For clients maintaining omnibus accounts at the Clearing Members (**Client C** in the diagram), the smart contract at the Clearing Member node required the CCP to have a view of the beneficial ownership of the collateral, however further work can be done to shield the CCP from viewing buy-side client account details, and maintain privacy and user account hierarchy between CCPs, clearing members and their clients.

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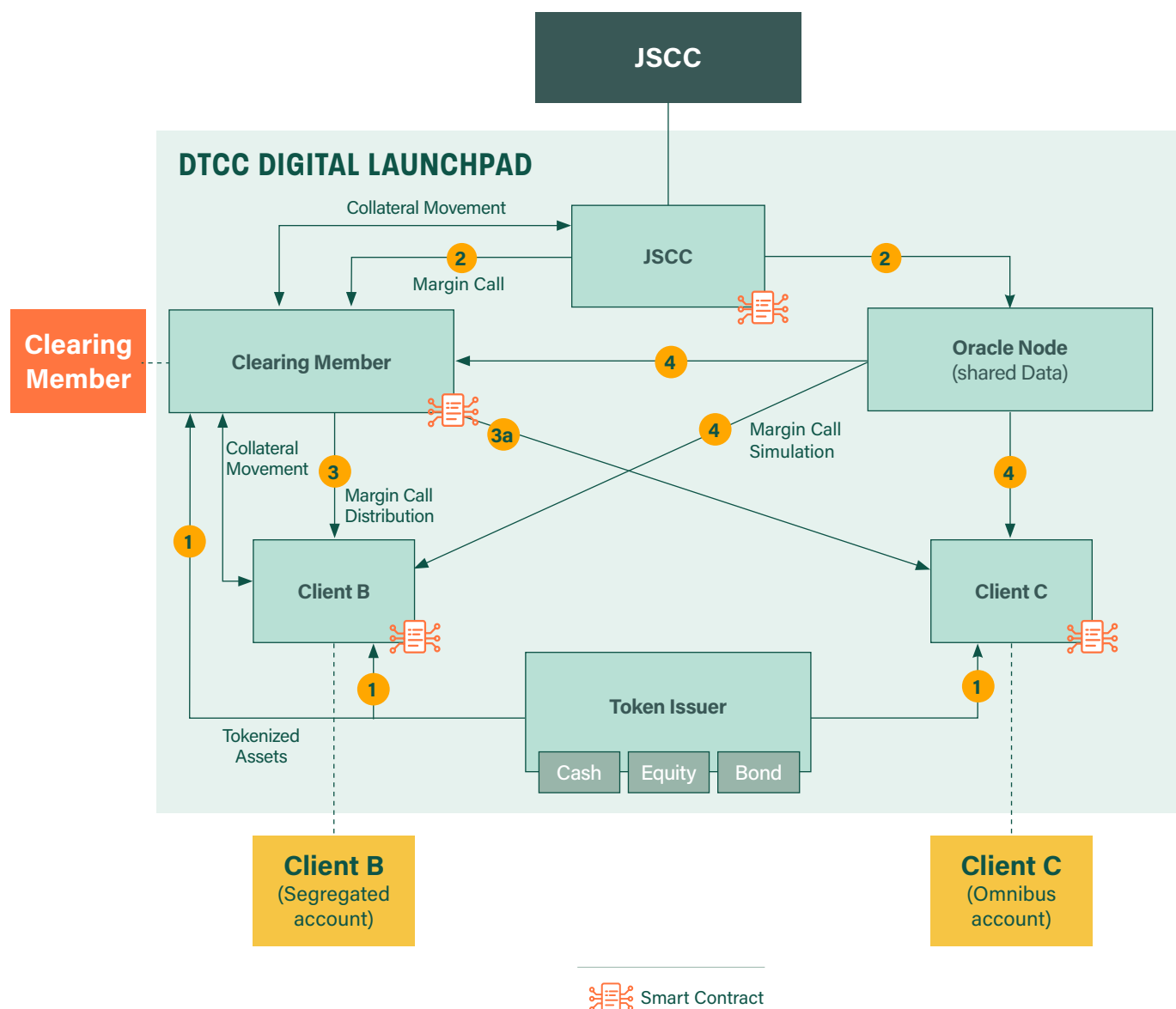
**Step 4.** JSCC created an Oracle node to act as an on-chain shared database on the network to provide network members with static and market data such as eligible collateral criteria, latest asset prices, haircut ratios and other information needed for calculating collateral value, simulation, and optimization.

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JSCC also created a custom user interface which allowed clearing members and their clients to:

- Initiate and track transactions.
- Fetch real-time asset price and other market data from the Oracle to allow clients to simulate margin call(s) and identify its effect on their asset positions.

# JSCC EXPERIMENTATION BLUEPRINT ON THE DTCC DIGITAL LAUNCHPAD



By building on the DTCC Digital Launchpad, JSCC focused their efforts on designing the business processes and workflows required to reimagine the collateral management process for their participants, without having to expand any efforts in developing and maintaining their own distributed ledger platform or technical infrastructure.

Using the Digital Launchpad, JSCC issued digital assets such as cash, stocks, and bonds as native digital assets for their initiative, and develop the smart contracts required to enable and automate the business workflows. Furthermore, JSCC developed an on-chain shared database to enable POC participants to access static and market data, such as real-time market prices of assets and haircut ratios, for evaluating their asset positions and optimizing their portfolios for different margin call scenarios. By tokenizing assets and automating the calculations and exchange of collateral, JSCC realized operational and capital efficiencies for each market participant in their ecosystem.

## THE POC DEMONSTRATED:

### ➤ Seamless integration of DLT margin calls and DLT deposits/withdrawals:

**Existing Process:** Currently, the workflows for distributing margin calls from CCPs and posting margin to CCPs are disparate, resulting in redundant matching/reconciliation processes and errors across markets. Moreover, a single CCP can issue multiple margin calls in a day, generating numerous records for each product, account, margin type, and cycle. Clearing members (sell-side institutions) must manage these with various CCPs on behalf of their buy-side clients worldwide.

**What the PoC demonstrated:** Connecting margin calls and deposits through smart contracts and tokenized collateral created a seamless process among CCPs, clearing members, and buy-side clients, greatly enhancing efficiency and reduce manual processing.

### ➤ Smart contracts to automate business processes reduced operational risks and inefficiencies across all layers – CCP, sell-side (clearing members) and buy-side:

**Existing process:** In CCP-cleared derivatives markets, sell-side and buy-side collateral must be deposited into CCPs regularly. The workflows amongst CCPs and their clearing members (sell-side) is a separate process from the workflow between sell-side and buy-side. Therefore, collateral from the buy-side must be passed via sell-side bank accounts/systems/networks and deposited finally into the CCP's collateral account. This relay process leads to significant inefficiencies and operational risks.

**What the PoC demonstrated:** Smart contracts to automate business workflows and enable movement of digital assets can not only increase STP/automation in the end-to-end process but also increase optionality for institutions involved. For example, they can enable "synthetic" direct deposits from buy-side clients to CCPs with logical approval by sell-side institutions. This can significantly enhance collateral mobility and liquidity, even when institutions are in different time zones, which can lead to significant capital efficiencies for Clearing Members, while reducing operational risks.

### ➤ Shared smart contracts/applications standardized across three-layers:

**Existing process:** Each CCP offers collateral management (margin call, deposit, withdrawal) to its members. Clearing Members provide similar services to their buy-side clients, interacting with multiple CCPs globally. Buy-side institutions often use multiple Clearing Members for these services, leading to redundant applications and databases across the three layers.

**What the PoC demonstrated:** Digital assets offer financial markets a chance to rethink the ecosystem design to standardize and automate processes and applications. JSCC's POC developed and deployed shared applications (smart contracts and UI designed to work for all institutions) on DTCC Digital Launchpad. With on-chain tokens and smart contracts, JSCC could confirm end-to-end scenarios from CCP margin calls to buy-side collateral deposits via clearing members.

➤ **Improved collateral swap across multiple digital assets (cash/stocks/bonds):**

**Existing process:** Both Clearing Members and their clients frequently need to substitute the assets held as collateral at CCPs as their funding strategies change. This necessitates the allocation of surplus collateral, as CCP guidelines strictly prohibit collateral held from falling below margin requirements even temporarily, to prevent any risk of default.

**What the PoC demonstrated:** JSCC verified the technical viability of CCPs enabling seamless collateral substitutions (Delivery-vs-Delivery) using the atomic transactions feature of DLT. This feature allows multiple transactions to be executed as a single unit, ensuring that either all transactions succeed, or all fail simultaneously. This facilitates more flexible and dynamic collateral replacement for institutions, while complying with the CCPs' risk management requirements.

➤ **Utilizing on-chain shared data increased transparency, and enabled network participants to keep their collateral and asset positions optimized:**

**Existing process:** As market prices fluctuate, it is essential for all parties to regularly recalculate the value of deposited collateral and ensure they can monitor and manage risks in accordance to their own policies and models. Central Counterparties (CCPs) establish rules for various collateral types and offer collateral valuation services to their Clearing Members. However, both sell-side and buy-side entities require their own solutions and data sources for recalculating and optimizing their collateral positions.

**What the PoC demonstrated:** JSCC developed an Oracle node to act as an on-chain database accessible to all entities in the POC. By using the Oracle node as a 'golden source' of data coupled with shared smart contracts, sell-side and buy-side entities on the network were able to simulate and optimize their collateral positions under different market scenarios, in near real-time. This significantly improved the ability of network participants to monitor and manage risks, particularly in volatile market conditions.

In further phases of the POC, network participants could also use other capabilities being built on the Digital Launchpad to track their wallets and tokens positions in real-time and integrate them with off-chain data to orchestrate actions in their traditional systems and provide critical business intelligence to their operations and risk management teams.

➤ **Managing user account hierarchies requires experimenting with DLT privacy solutions:**

**Existing process:** Especially in the listed derivatives market, the unique and complex structure of 'omnibus' accounts presents challenges for ecosystem design. Buy-side client data, housed within omnibus accounts, is managed by individual sell-side clearing members and remains hidden from the CCP. This results in a complex market structure with a hierarchy exceeding three layers.

**What the PoC demonstrated:** To maximize the benefits of digital assets used as collateral for listed derivatives, it is crucial to consider this account hierarchy. JSCC created a tiered application structure allowing sell-side entities to manage their own omnibus accounts through a UI. However, in this setup, the network owner (the CCP in the POC) had access to all data. Addressing this will necessitate DLT-based data privacy solutions or the establishment of comprehensive governance rules.

## THE PATH FORWARD

JSCC is planning to leverage DTCC's Digital Launchpad to build on the foundation established in its original use case. In these future initiatives, JSCC aims to further explore the feasibility of using digital assets and DLT to enhance their collateral management processes. Building on the proof of concept, JSCC has identified multiple avenues for continued experimentation – while progressing towards production implementation to meet the needs of their ecosystem clients. These could include interoperability with international CCPs, which would allow global firms to open, link, and manage accounts across multiple jurisdictions, or facilitating simultaneous collateral deposits and swaps across international borders. Other areas for experimentation might involve managing life cycle events for bonds or equities used as collateral.

The PoC highlighted the need for advanced privacy solutions to protect account hierarchies within omnibus structures and limit network operators' visibility of individual accounts. Future efforts should focus on refining the smart contracts used in the PoC to meet diverse market participant requirements across various asset types, while ensuring their manageability and auditability. Additionally, further development of real-time asset position monitoring and optimization capabilities for network participants could be a valuable area of exploration.

JSCC's pioneering work demonstrates the value of common standards and open, incremental experiments in benefiting the entire ecosystem - which is exactly what we've built the DTCC Digital Launchpad to enable and support. JSCC's focus aligns with DTCC's vision to develop advanced collateral solutions that optimize capital, increase liquidity for members of our clearing businesses, and reduce operational costs across the industry. We are excited to collaborate with JSCC and other partners to create innovative solutions that enhance global liquidity and streamline all aspects of collateral management.

At DTCC, we're advancing the development of common standards for data and interoperability along with the controls and operational processes needed to make digital assets work for the capital markets industry. We're building the DTCC Digital Launchpad as a rallying point to the industry to come together, imagine, discuss, and explore all the possibilities offered by digital assets and blockchain technology.

Our mission is to unite the industry to tackle complex problems, accelerate the adoption of digital technology, and build a new industry ecosystem together. Contact us to learn more about how you can bring your digital asset projects to fruition.



See you on the [Launchpad!](#)



To learn more about us, please visit  
**[dtcc.com/digital-assets](https://dtcc.com/digital-assets)**

#### ABOUT DTCC

With over 50 years of experience, DTCC is the premier post-trade market infrastructure for the global financial services industry. From 20 locations around the world, DTCC, through its subsidiaries, automates, centralizes, and standardizes the processing of financial transactions, mitigating risk, increasing transparency, enhancing performance and driving efficiency for thousands of broker/dealers, custodian banks and asset managers. Industry owned and governed, the firm innovates purposefully, simplifying the complexities of clearing, settlement, asset servicing, transaction processing, trade reporting and data services across asset classes, bringing enhanced resilience and soundness to existing financial markets while advancing the digital asset ecosystem. In 2023, DTCC's subsidiaries processed securities transactions valued at U.S. \$3 quadrillion and its depository subsidiary provided custody and asset servicing for securities issues from over 150 countries and territories valued at U.S. \$85 trillion. DTCC's Global Trade Repository service, through locally registered, licensed, or approved trade repositories, processes more than 20 billion messages annually. To learn more, please visit us at [www.dtcc.com](https://www.dtcc.com) or connect with us on [LinkedIn](#), [X](#), [YouTube](#), [Facebook](#), and [Instagram](#).

#### ABOUT DTCC DIGITAL ASSETS

DTCC Digital Assets offers scalable institutional-grade technology solutions for clients to create and manage the life cycle of tokenized assets. Our capabilities support multiple blockchains, provide advanced on-chain data access and actionable intelligence, facilitate near-real-time payments, and automate back and middle office functions, all while prioritizing regulatory compliance. Designed for interoperability with a client's existing systems and capabilities, DTCC Digital Assets' solutions will provide the foundation for an industry-wide ecosystem bridging DeFi with TradFi.

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